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Towards the setting up of an archaeometric data bank of the pottery produced in Italy

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ABSTRACT. — The aim of this paper is to present a project recently set up at the Free University of Berlin (Institute of Classical Archaeology) concerning the creation of a chemical data bank of archaeological ceramics produced in Italy (with particular reference to the classical age, but also including data on ceramics of medieval times).

The core part of such data bank consists of chemical data (X-ray fluorescence method) obtained in the past at the «Laboratoire de Céramologie» of Lyon (M. Picon) and data acquired by chemical analyses carried out at the «Arbeitsgruppe Archäometrie» of Berlin (projects by G. Olcese).

RIASSUNTO. — Viene presentato un progetto avviato recentemente nell'ambito della Freie Universität di Berlino (Institut für klassische Archäologie) concernente la creazione di una banca di dati chimici delle ceramiche archeologiche prodotte in Italia (con particolare riferimento all'epoca classica, ma comprendente anche dati sulle ceramiche di epoca medievale).

Il nucleo di tale banca dati è costituito dai dati chimici (metodo della Fluorescenza a raggi X) ottenuti negli anni passati presso il Laboratoire de Céramologie di Lione (M. Picon) e dai dati delle analisi chimiche effettuate a Berlino presso l'Arbeitsgruppe Archäometrie (progetti G. Olcese).

KEY WORDS: *ceramics data bank; chemical analysis (XRF) of ancient ceramics from Italy; determination of the origin.*

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INTRODUCTION

1. Determination of the origin of ceramics and data bank

The aim of this short paper is to inform in outline about a project recently set up, and still under way, concerning the creation of an archaeometric data bank (in particular, chemical) of the pottery produced in Italy.

The main objective of the data bank is to make the archaeological and archaeometric researches, concerning the production and diffusion of Italic pottery, in Italy and out of Italy, easier.

The production and diffusion of ceramics are today two important fields of study of the archaeology that tries to reconstruct the ancient economy.

It has been insisted several times on the necessity of a scientific approach to these fields of research. The researches carried out in various laboratories in the past years have proven how significant is the contribution of the archaeometric analyses (chemical and mineralogical) to the studies on the determination of the origin.

The laboratory procedures are based, in this case, on the comparison among the compositions of different ceramics. The comparison is among the compositions of ceramics of known origin (both kiln waste

products and pottery abundantly testified in a region and of likely local production) and those of ceramics whose origin is still unknown.

To determine the origin of archaeological pottery in laboratory it is therefore essential we can count on a series of comparison data which allows to confirm the origin suggested for one or more ceramics.

For a long time now it has been insisted on the need to arrange archaeometric research data in data banks and in several centres some projects have been set up.

The higher the number of sites encompassed the more precise is the contribution of data banks to the archaeometric research.

As a matter of fact the value of data banks is not just in the number of data they encompass, but rather in the number of sites of a region in them represented.

2. *The data bank on the pottery produced in Italy*

The data bank that is being set up thanks to a funding got by the Freie Universität Berlin includes chemical data acquired via the analysis of ceramics analysed by the x-ray fluorescence method (Picon, 1991, 1993 and 1995).

The data bank results from the merging of the data got in two laboratories: the analyses carried out by M. Picon at the «Laboratoire de Céramologie» of Lyon (which represent the predominant part of the data) and those carried out in the projects of G. Olcese at the «Arbeitsgruppe Archäometrie» of the FU Berlin, with the help of G. Schneider.

The preliminary phase of the work, carried out with the aid of a computer scientist, included:

a. the data bank setting up, through the merging of the data acquired in two different laboratories

b. the check and revision of a few programs usually employed in the statistical processing of chemical data.

It has been considered, in particular, programs for the constitution of groups and those for the attribution of one or more ceramics to a predetermined group (cluster analysis and quadratic discriminant analysis).

They are two methods usually employed in the research data processing, adopted in Lyon and Berlin as well, and for which theoretical fundamentals exist already since the 80s (Picon, 1984a and b; Schneider, 1978).

For the cluster analysis we employ a program, written some time ago by Picon in Lyon for the statistical processing of data acquired via the chemical analysis of pottery (Picon, 1984 b), up-dated and adapted for PC use.

As completion of the Lyon programs it has been considered the program package of the Brookhaven National Laboratory (Smithsonian Institute) put at disposal by E. Sayre for the Berlin «Arbeitsgruppe Archäometrie».

But what the authors are concerned about, in this preliminary report, is to recall some of the data bank features, which perhaps, at least in part, make it stand out from other experiences formerly undertaken.

There are basically two ways to construct an archaeometric data bank on ceramics:

The first consists in accumulating analyses awaiting study situations to arise or researches that make use of those data to be undertaken.

The second, which has been adopted for our work, is progressive, that means that it proceeds gradually in the analyses undertaken and by problems. That is to say it aims at the solution of a specific archaeological problem, to widen afterwards to close and related problems.

The data bank consists therefore of data *not accidentally* assembled, but drawn from targeted researches aiming at the solution of archaeological questions concerning production and diffusion, very specific questions the archaeologists put or we selected among those which, in a potential hierarchical scale of problems, seemed more important to be tackled with the support of laboratory analyses.

It is of prime importance for our data bank the constant link with archaeology and the issues the archaeological research raises.

The data bank encompasses ceramics made in Italy, found in, but also out of Italy, arranged in geographic areas (Tables 1 and 2).

TABLE 1
Sites of findings
Italy of ceramics analysed (XRF)
L = Lyon; B = Berlin

<p>LIGURIA</p> <ul style="list-style-type: none"> Albintimilium (B) Albenga (L) Albisola (L) Arma di Taggia (L) Bussana Vecchia (L) Genova (L) Taggia (L) Savona (L) Villanova d'Albenga (L) 	<p>PIEMONTE</p> <ul style="list-style-type: none"> Alba (L) Aosta (L) Eporedia (L) Ivrea (L) Tortona (L) Villa del Foro (L)
<p>LOMBARDIA</p> <ul style="list-style-type: none"> Allerona (L) Borgo Priolo (L) Brescia (B) Cremona (L) Lugagnano (L) Milano (L) 	<p>EMILIA ROMAGNA</p> <ul style="list-style-type: none"> Bologna (L) Magreta (L) Parma (L) Piacenza (L) Rimini (L) S.Arcangelo di Romagna (L) S.Ermete (L)
<p>VENETO</p> <ul style="list-style-type: none"> Adria (L) Verona (L) 	<p>TOSCANA</p> <ul style="list-style-type: none"> Albinia (L) Arezzo (B, L) Arezzo, S.Maria in Gradi (L) Arno regione (L) Arno rive (L) Bacchereto (L) Cecina (L) Cincelli (L) Cosa (L) Firenze (L) Livorno (L) Livorno, La Mazzanta (L) Montelupo Fiorentino (L) Portus Cosanus (L) Pisa (L) Torrita di Siena (B)
<p>UMBRIA</p> <ul style="list-style-type: none"> Città della Pieve (L) Deruta (L) Scoppieto (B) 	

CONTINUED: *Table 1*

<p>LAZIO</p> <p>Astura (L) Bolsena (L) Cadeo (L) Capena (L) Cerveteri (L) Chiusi (L) Fondi (L) Formia (L) Fregellae (L) Macchia di Freddara (B) Minturno (L) Olevano (B) Ostia (B, L) Paliano (B)</p> <p>Roma (B) Roma Celio (B) Roma Concordia (B) Roma Gianicolo (B) Roma La Celsa (B) Roma Palatino (B) Roma Teatro Argentina (B) Roma Tevere (B) Roma via U.Moricco (L) Roma Villa Quintili (B)</p> <p>Segni (B) Sutri (B) Tarquinia (L) Tivoli (B) Tolfa (B) Vasanello (B) Velletri (L)</p>	<p>CAMPANIA</p> <p>Cales (L) Cascano (L) Dugenta (L) Ercolano (L) Falciano (L) Garigliano (L) Gran Celsa (L) Ischia (B, L) Masseria Dragone (L) Masseria Zanini (L) Masseria S.Andrea (L) Mondragone (L) Napoli (B, L) Nocera (L) Oplontis (L) Pompei (B, L) Pozzuoli (L) Salerno (L) Teano (L)</p>
<p>BASILICATA</p> <p>Paestum (L) Velia (L)</p>	<p>PUGLIA</p> <p>Grottaglie (L) Giancola (B) Ordona (L)</p>
<p>SICILIA</p> <p>Gela (L) Megara Hyblaea (L) Morgantina (L) Pantelleria (L) Selinunte (L)</p>	

With regard to chronology, it ranges from the colonisation period to the Middle Ages, though some chronological bands are predominantly testified (for instance, the Roman age, the late Republican period).

As a matter of fact it reflects, on the one hand the decennial researches carried out by M. Picon in Lyon, and some by G. Olcese on a few themes such as:

– *the production and technology of the fine Roman wares in the Mediterranean*, in particular the black gloss, terra sigillata and thin-walled wares (Picon and Olcese, 1998; Olcese, 1998);

– *or the production of some groups of common ware*, whose diffusion goes beyond the local/regional area (Olcese, 1993);

– *the production of amphorae* in some Italy's key areas, in the Republican and Roman period (Olcese, 2001/2002).

It also attests the will to deepen the knowledge of *key areas* (Etruria, Latium, Campania and the Po river area) for the Roman period. Thus most of the data concern these very areas.

3 - Some information about the data bank structure

The data bank includes mainly groups of reference and groups of composition.

The **groups of reference** consist of groups of ceramics whose origin is certain (coming, for example, from producer sites) submitted to analysis and whose chemical and/or mineralogical composition is known.

On many occasions it has been insisted on the importance of the groups of reference which make the determination of the origin operations easier and allow to state, for example, that two groups of ceramics have a common origin (Olcese and Picon, 1995).

However, since in Italy there are only few known and investigated centres of pottery production, it is not always possible to count on groups of reference. The research must therefore be broadened to other ware classes of likely local production and it must be paid special attention to the data drawn from the

properly archaeological investigation which allows to make progress with the researches on the determination of the origin.

Thus the data bank includes also ceramics found in non-producer sites, namely those recovered in consumption sites (mostly habitation sites), which we call **groups of composition**.

The groups of composition are ceramic sets created on archaeological basis (groups of ceramics with similar typological and/or technological features) submitted to analysis, which take on some importance for the knowledge of the compositions of an area, especially when there are no groups of reference.

Therefore, to summarise the new data bank features:

- it centres on ceramics of Italic production, without chronological limits
- it is being progressively broadened, as very specific archaeological problems are being tackled
- it aims at the investigation of subjects of research which remain constant in different periods and geographical areas (study of the production areas, the establishment and organisation of workshops, the diffusion of wares with peculiar technological features).

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